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PSYCHOLOGICAL ASPECTS OF CORONARY HEART DISEASE. (U)
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R. H. RAHE

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PSYCHOLOGICAL ASPECTS OF CORONARY HEART DISEASE *

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OVERVIEW

For the clinical practitioner interested in the psychological management of patients with coronary heart disease (CHD), it is critical to have some grasp of both developmental characteristics of patients prone to this disorder as well as knowledge of the acute precipitating influences of recent life stress. Confusion abounds regarding these two rather distinct areas. Crucial among the developmental influences upon CHD proneness seem to be occupation-education disparity ("over-achievement"), Type A coronary behavior, and chronic life dissatisfactions. The best measure of recent life stress is an inventory of the patient's recent life changes.

Optimal treatment of patients with CHD can be achieved with a knowledge of both the physical and the psychological aspects of this disease. In addition to the management of physical risk factors for this disorder, group therapy has proven to be a successful approach in the rehabilitation of patients recovering from acute myocardial infarction. Group therapy with these patients should include medical education, discussion of relevant developmental issues, and recent life stress.



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Studies of the influence of psychological factors in the development, onset, and course of CHD number in the hundreds (Jenkins, 1971). This paper will present highlights from this area of study, with more detailed presentations of data where the author has had personal experience. Mention will be made of psychosocial factors in the developmental history of persons who go on to develop CHD. Recent life change stress surrounding clinical onset of this disease will be dealt with in some detail. Finally, the use of group therapy in CHD rehabilitation will be presented.

The reader should be aware that the psychological dimensions presented are not by themselves sufficient causes of this illness. Other critical factors, such as genetic predisposition, various metabolic diatheses, hypertension, cigarette smoking, diet, and lack of physical exercise are not presented here (The Pooling Project Res Grp, 1978). It's the combination of psychological and physical predispositions that lead to greatest vulnerability for this, our number one health problem.

Developmental Aspects

The importance of psychological factors in the developmental history of persons who go on to experience CHD is difficult to establish with precision. Most studies have been retrospective investigations conducted with small, non-representative, samples of patients. Prospective studies require nearly a generation to achieve a sufficient number of persons who go on to develop CHD before a proper interpretation of the data can be rendered. None-the-less, widely scattered information in this area has led to some fascinating suggestions.

Persons prone to develop CHD often come from families of large numbers of children with parents who tend to have working class backgrounds. Patients' fathers have frequently set a stern example of the importance of hard work. It is

not uncommon for CHD patients to have held part-time, or even full-time, jobs while in their teens. Further, a theme of rebelliousness has been found in the early life of CHD patients. As teen-agers, occasional truancies from school, run-ins with their teachers, and troubles with the law are reported. Also, CHD patients frequently leave their formal schooling early, much to their regret in later life.

Carolyn Thomas, at Johns Hopkins University, examined by clinical interview and psychological testing each entering medical student from 1948 to 1964 (Thomas & Greenstreet, 1973). She has been able to follow the health of these doctors as they later pursued their medical practices. Twenty of these physicians have developed acute myocardial infarctions (MI) or angina pectoris. As medical students these persons reported tendencies toward chronic life dissatisfactions and psychological depression at a significantly higher rate than their classmates.

The development of a hypertrophied work behavior in persons who are prone to develop CHD appears to be a prominent psychosocial feature of this group. Work is taken on with grueling determination, intensity, and persistence. Multiple jobs are common. CHD patients often approach their work in a "bullheaded" fashion rather than with finesse. That is, short cuts are scorned and delegation of work to others is rejected for reasons such as: "By the time I show him (her) how to do this job right, I might as well do it myself". Thus, one reason these persons tend to work such long work hours is their relatively inflexible and time-consuming approaches to their jobs.

Another consistent finding is that CHD patients commonly attain levels of job responsibility that are quite demanding for persons with their limited educational backgrounds. They then have to compete with coworkers who have substantial educational and social class advantages over themselves. This occupation-education discrepancy ("over-achievement") makes their work far more demanding than it is for their more advantaged colleagues.

CHD is a disease of the 20th Century. Even the writings of famous 19th Century physicians made scant reference to it. For example, Heberdeen commented mainly on angina pectoris--the most benign clinical form of this disease. Epidemiological studies of the prevalence of CHD over this century noted a steady rise until very recently, when rates appear to have leveled off and even begun a slight decline. Therefore, among important developmental influences for CHD proneness must be included the psychosocial demands of living during the first three quarters of the present century.

Coronary Behaviors

Closely related to developmental influences in persons prone to CHD are a set of behavioral predispositions. These behaviors, apparently learned early in life, have been assigned labels, such as "Coronary Prone Behavior Pattern" ("Type A") and "Sysiphus Phenomenon." Such labeling gives the impression of separateness while, in truth, these behaviors share some overlap.

Coronary Prone Behavior Pattern was mentioned, in part, early this century by clinicians such as Osler and Dunbar. However, Type A was brought to the attention of modern day clinicians by Friedman and Rosenman in 1959. This Behavior Pattern includes aggressive, competitive, hostile interpersonal characteristics coupled with intense striving at work and a time-urgent approach to life in general. These individuals talk fast, eat fast, move fast, and are extremely impatient when thwarted or delayed by others. I have published a brief questionnaire which estimates these dimensions of overwork, striving, and time-urgency. (See Table 1). Although questionnaires are helpful, Rosenman argues effectively for the superiority of the structured interview over questionnaire estimates. Many Type A persons, for example, lack the necessary insight to recognize these behaviors in themselves.

[Place Table 1 about here]

Sisyphus Phenomenon, proposed by Stewart Wolf and colleagues, derives its name from the legendary King of Corinth who was condemned to Hades and given a task of ceaselessly rolling a large stone up a mountainside. When the stone reached the top, it rolled down the other side and sisyphus' labors began anew. Thus, behaviors which might be characterized as joyless and ceaseless striving have been labeled the Sisyphus Phenomenon. This coronary behavior appears quite similar to what Thomas noted in the Johns Hopkins medical students who went on to develop CHD in their later years. In my coronary behavior questionnaire, I included several questions regarding the presence or absence of life satisfactions (Table 1).

Both Type A and the Sisyphus Phenomenon have been included as psychological risk factors in prospective studies of CHD. Type A behavior was second only to serum cholesterol in its ability to predict new cases of acute MI or sudden coronary death in Rosenman's studies (Brand, Rosenman, and others, 1976). Sisyphus Phenomenon predicted reinfarction and sudden coronary death in Wolf's investigations. In fact, Wolf and colleagues found that when Type A and Sisyphus were both present in an individual, near-future CHD risk was even higher than it was for patients with one or the other behavior separately (Brahn, and others, 1974).

Recent Life Stress

Evidence documenting that a person's recent life circumstances exert a significant influence upon the onset of clinical manifestations of CHD (angina pectoris, acute myocardial infarction, and sudden coronary death) is often poorly presented in the scientific literature. Thus, the author will take the reader through a step-wise presentation of his material on this subject.

a. Life Change Questionnaire

First, systematic evaluation of life circumstance requires a research instrument. The one devised by the author (originally entitled the Schedule of

Recent Experience [SRE]) is the Recent Life Changes Questionnaire (RLCQ). (See Table 2). This questionnaire samples recent alterations in a person's work, family, social, interpersonal, religious, and financial life (Rahe, 1975). The rationale which led to assessment of recent life change events as one index of life stress is based on the physiological model of homeostasis. That is, change in one's recent life circumstance requires adaptation on the part of the individual. Processes of adaptation are associated, among other dimensions, with physiological arousal. The more intense the psychosocial demands the more intense are the physiological ramifications. Severe and/or prolonged psychophysiological arousal can lead to dysfunction in vital body systems with eventual precipitation of disease processes to which an individual is already predisposed to developing. Therefore, recent life change stress may precipitate clinical onset of CHD; this only occurs, however, in those individuals with requisite predispositions to develop for this disorder in the first place.

Table 2 presents the list of recent life change events included in the RLCQ as well as scaled intensity values for these events (determined for senior U.S. Navy enlisted men). In most of the studies using the RLCQ (or the parent instrument--the SRE) scaled intensity values for each life change event are used. These values, called Life Change Units, or LCU, add a dimension of quantification to the life change instrument. However, valuable information can still be obtained by simply counting the number of life changes recently experienced by a person as indicated from the RLCQ list and comparing these counts to baseline estimates.

[Place Table 2 about here]

b. Baseline Estimates

To establish whether a person's life setting prior to CHD onset is characterised by more recent life changes than expected to occur, "baseline"

estimates of recent life change should be carried out. Baseline LCU values vary depending upon the age of persons studied as well as the culture from which they are drawn. Baseline estimates also provide information on the ups and downs of recent life change which occur secondary to societal or economic forces. For example, we carried out a baseline estimate on healthy persons in Stockholm, Sweden. A peak in recent life change, calculated for quarter-year intervals over a three-year period, is seen in late 1967 (Figure 1). At this time a major agricultural reform was introduced which caused many small farmers to sell their land and move to the city. Also, a political decision to change from left-hand to right-hand driving was enacted that year. These societal changes may have influenced the observed peak. (Theorell and Rahe, 1971)

[Place Figure 1 about here]

Baseline life change estimates can also help answer the question whether or not a fall-off in life change reporting is noted as a person remembers further back in time. In other words, is there a "forgetting curve"? Figure 1 does not show much evidence of forgetting more and more life changes over three years' time. We also tested for possible forgetting by asking patients who experienced a MI two to three years in the past to report their life changes over the past four years. Forty seven patients so studied recalled a build-up in life changes, from a baseline level of 20-25 LCU per quarter-year to nearly twice that level at the time of MI. Then they reported a gradual return to baseline levels over their period of recovery up to the time of study. Their most recent life change levels were at the same baseline levels recalled four years previously. Thus, they remembered an increase in events at the time of MI, even though it was three to four years ago. No "forgetting curve" was seen. (Rahe and Paasikivi, 1971)

[Place Figure 2 about here]

c. Life Change Build-up

It is particularly instructive to compare CHD patients pre-MI LCU levels to their own LCU baseline determinations. That is, LCU levels for the six months immediately prior to MI should be compared to LCU values for a similar time interval one year earlier. As shown in Figure 3, when this was done for 27 patients who developed an acute MI, who had no previous history of heart disease, the amount of life change seen in the six months time immediately before MI was significantly greater (nearly a two-fold increase) than that seen for the chronologically identical six-month interval one year before. (Theorell and Rahe, 1971)

[Place Figure 3 about here]

Recent life change profiles for acute MI patients with a history of heart disease may not show the LCU build-up evidenced in Figure 3. The recent life change pattern for 27 patients with a prior history of CHD who then developed an acute MI is shown in Figure 4. Very likely these patients had been in the state of elevated life change partially due to their illness over the three years prior to their MI. (Theorell and Rahe, 1971)

[Place Figure 4 about here]

Although our previous studies had indicated that recent life change levels are higher in persons experiencing severe illnesses (some resulting in death) than in persons with minor disease, we were still surprised to observe the dramatic build-up in life change events prior to sudden coronary death (Rahe and Lind, 1971). Next-of-kin of 37 Stockholm residents who died suddenly from their (autopsy verified) CHD reported a two- to three-fold life change build-up in these victims' lives. This LCU build-up was apparent both in the lives of 27 persons with prior histories of CHD (Figure 5) as well as for the 10 individuals who were in apparent good health until the time of their fatal event (Figure 6).

[Place Figures 5 and 6 about here]

d. Replication

Findings reported above take on added reliability when they are replicated. The Swedish studies were replicated in a study of 279 Finnish persons experiencing MI and 226 victims of sudden coronary death in Helsinki. The findings from these Finnish studies were virtually identical to those from the earlier Swedish investigations. Recent life change build-up in individuals surviving a MI was nearly two-fold over the six months immediately prior to infarction compared to the same chronological time interval one year earlier while life change build-up was nearly three-fold in victims of abrupt coronary death (Rahe, and others, 1974). Spouses of MI survivors reported recent life changes data for their mates in these studies to examine whether spouse reporting (utilized in cases of sudden coronary death) resulted in an inflated LCU report compared to reports from MI survivors themselves. No evidence for LCU inflation in spouse reports was found.

e. Prediction

Difficulties in predicting new episodes of CHD in populations of healthy persons are formidable. Thousands of persons must be followed a decade or longer in order to observe sufficient numbers of new cases of CHD for accurate statistical analyses. Further, recent life change elevations are associated with many different illnesses. Therefore, high life change levels predict illness in general-not CHD in particular.

It is far more feasible to predict recurrences of acute episodes of CHD in samples of persons who have already shown their propensities to develop this illness. Here, the predictive task is one of attempting to identify those persons most likely to experience reinfarction, or sudden coronary death, in a group of individuals who have recovered from their first MI.

Two such studies have been carried out utilizing life change information along with the conventional medical "risk factors" (cigareete smoking, blood pressure,

serum cholesterol, and so forth). The first study was performed by Stewart Wolf and associates at the University of Oklahoma over an eight-year interval (Theorell and Rahe, 1975). The second study was conducted by Tores Theorell in Stockholm, Sweden (Theorell and others, 1972).

In the first study, 36 patients who had recovered from their first MI were followed until nearly half of them suffered a second MI or became a victim of abrupt coronary death. The utility of recent life change data in predicting patients who would ultimately suffer CHD recurrences is shown in Figure 7. Mean LCU levels remained quite constant over time in the group that remained healthy; however, a markedly significant increase in mean LCU level was observed to occur in the 12 to 18 month interval prior to reinfarction or coronary death in the afflicted group. The life changes were gathered by interview, not by questionnaire in this study. As the number of recent life changes reported could have been influenced by the number of times patients came to visit the follow-up clinic (more opportunities to report possible changes), clinic visits are also plotted in the figure. Even controlling for clinic visits, the life change build-up seen prior to reinfarction or sudden death remained significant. Of major interest was the finding that the recent life change build-up was seen to occur months prior to the appearance of any physical evidence of incipient cardiac decompensation.

[Place Figure 7 about here]

The second prospective study was a pilot investigation of 21 patients who had recovered from their first MI who reported back to the hospital clinic once a week over two to three months' time. At each clinic visit they completed the RLCQ for the past week as well as brought with them a 24-hour urine sample collected over the previous day. Urine samples were analyzed for catecholamine excretion. Serum cholesterol also was also measured. Most patients did well following their MI but a few had exacerbations of angina pectoris. One example is shown in Figure 8.

A 49-year old, married foreman mechanic reported some difficulties at work and personal strains in his life during the first week of follow-up. The next week his mother was discovered to have cancer. Further personal problems occurred during the third week. The patient's urinary catecholamines were seen to build to a peak over these first weeks. The next crescendo of life events was seen during his seventh follow-up, when he had difficulties with his wife and a close friend develop an MI. The next week his mother underwent cancer surgery. In addition, he had further personal, work, and family problems over this as well as the following week. Concomitant with this build-up of life events, he experienced his most pronounced catechoamine excretion. It was in this setting of life change build-up, with some feelings of depression, that he reported a severe bout of angina pectoris. Life changes, catecholamines, and symptoms gradually abated over the last two weeks of follow-up. Serum cholesterol appeared to vary inversely with catecholamine excretion.

[Place Figure 8 about here]

Group Therapy in MI Rehabilitation

Rehabilitation efforts should ideally begin shortly after a patient's admission to the coronary care unit. At the University of California at Los Angeles we established an educational program for patients, and their spouses, during the first and second weeks of hospitalization (Rahe, and others, 1975). These programs operated under severe time-constraints due to the current trend to discharge patients as early as possible following an uncomplicated MI. Thus, only a beginning could be made in such programs in the hospital. For long-term success, rehabilitation must combine early educational approaches with follow-up outpatient treatment over the first few weeks to months following hospital discharge.

The author carried out an experimental program over five years' time of adding group therapy to the standard medical outpatient care of patients surviving their

first MI (Rahe, 1979). Since developmental influences, coronary behaviors, and the influence of recent life change upon clinical events had been shown to be important in the predisposition and the precipitation of this disease. Treatment for these psychological influences were combined with standard medical treatment approaches. A controlled trial, with random assignment of patients to either the group therapy plus medical treatment or to medical treatment alone (control group) was carried out. This pilot investigation was conducted with 44 patients--22 assigned to each group. Subsequently, another 17 patients received group therapy in a "replication" experiment.

All three groups of patients were compared in terms of past medical history, demographic characteristics, severity of infarct, and prognosis (Norris index). No significant differences were found between the groups for any of these dimensions. All groups received the same medical follow-up care, including counseling regarding diet, information concerning physical exercise, periodic checks on blood pressure and cardiac function, along with requisite medicinal prescriptions. In addition, patients in the group therapy program attended six, one and one-half hour group sessions. The first session was during their second to third week in the hospital and the remaining five sessions were continued over the first two to three months following discharge.

Group therapy sessions were roughly as follows. Between 4 and 12 patients comprised a group and were seen together throughout the six sessions. The first session usually dealt with life stresses associated with onset of MI, as well as an individual risk factor analysis for each patient. The second session dealt with developmental aspects, both medical and psychological, of this disorder. The third session usually focused on problems patients might be having regarding compliance with attempts to modify their risk factors. The fourth session usually centered around home problems--especially diet and exercise. Modification

attempts of patients coronary behaviors were frequently examined, along with aspects of returning to work, during the final two group sessions.

Follow-up over three to four years post MI showed the expected 5% per year reinfarction rate as well as the expected 3 to 5% per year mortality rate from this disease in our control group. However, no reinfarctions and no coronary deaths were seen in both treatment groups over follow-up. The differences between treatment and control groups achieved significantly higher return to work percentage (between 85% and 94%) than did the controls (50%). Thus, in terms of crucial medical and social indicators, our treatment groups fared significantly better than did the controls. The control group did no worse, however, than control groups in large, randomly allocated, drug studies carried out in this country.

It was difficult to explain fully the rehabilitation advantage seen for our group therapy patients. They did indicate a significant reduction in number of hours-per-week spent at work, minutes-per-day allowed for lunch, as well as number of vacation days taken per year (overwork measures). Also, in the controlled trial, group therapy patients reported a significant reduction in their time urgency levels compared to controls. However, no differences in life satisfaction were noted between groups over time and, if anything, controls showed better compliance with physical risk factor modifications (diet, body weight, exercise, and cessation of cigarette smoking) than treatment groups.

Aside from some achievements in coronary behavior modification we felt our major accomplishment was in providing crucial emotional support for these patients during their early period of cardiac healing. The coping advantage these patients achieved from group discussions of their disease and its management, although not precisely measured, appeared to be immensely helpful. Therefore, the judicious and knowledgeable use of information concerning the psychological aspects of CHD appears to add a significant rehabilitative advantage to the lives of patients recovering from this, our most prevalent life-threatening disease.

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RECENT LIFE CHANGES QUESTIONNAIRE

	LCU		LCU
A. HEALTH			
1. an illness or injury which:		25. a separation from spouse:	
(a) kept you in bed a week or more, or		(a) due to work?	49
took you to the hospital?	42	(b) due to marital problems?	56
(b) was less serious than described above?	25	26. a reconciliation with spouse?	42
2. a major change in eating habits?	29	27. a divorce?	62
3. a major change in sleeping habits?	31	28. a gain of a new family member:	
4. a change in your usual type and/or amount		(a) birth of a child?	49
of recreation?	30	(b) adoption of a child?	45
5. major dental work	40	(c) a relative moving in with you?	57
B. WORK		29. wife beginning or ceasing work outside the	
6. changed to a new type of work?	38	home?	37
7. changed your work hours or conditions?	33	30. wife becoming pregnant?	60
8. had a change in your responsibilities at work:		31. a child leaving home:	
(a) more responsibilities?	31	(a) due to marriage?	30
(b) less responsibilities?	29	(b) to attend college?	28
(c) promotion?	31	(c) for other reasons?	29
(d) demotion?	57	32. wife having a miscarriage or abortion?	53
(e) transfer?	38	33. birth of a grandchild?	31
9. experienced troubles at work:		D. PERSONAL AND SOCIAL	
(a) with your boss?	39	34. a major personal achievement?	33
(b) with co-workers?	35	35. a change in your personal habits (your	
(c) with persons under your supervision?	30	dress, friends, life-style, etc.)?	31
(d) other work troubles?	31	36. sexual difficulties?	49
10. experienced a major business readjustment?	38	37. beginning or ceasing school or college?	32
11. retired?	49	38. a change of school or college?	28
12. experienced being:		39. a vacation?	29
(a) fired from work?	64	40. a change in your religious beliefs?	29
(b) laid off from work?	57	41. a change in your social activities (clubs,	
13. taken courses by mail or studied at home		movies, visiting)?	28
to help you in your work?	29	42. a minor violation of the law?	32
C. HOME AND FAMILY		43. legal troubles resulting in your being	
14. a change in residence:		held in jail?	57
(a) a move within the same town or city?	28	44. a change in your political beliefs?	25
(b) a move to a different town, city or state?	38	45. a new, close, personal relationship?	32
15. a change in family "get-togethers"?	26	46. an engagement to marry?	39
16. a major change in the health or behavior		47. a "falling out" of a close personal relationship?	35
of a family member (illnesses, accidents,		48. girlfriend (or boyfriend) problems?	30
drug or disciplinary problems, etc.)?	52	49. a loss or damage of personal property?	40
17. major change in your living conditions		50. an accident?	44
(home improvements or a decline in your		51. a major decision regarding your immediate	
home or neighborhood)?	39	future?	45
18. death of a spouse?	105	E. FINANCIAL	
19. the death of a:		52. taken on a moderate purchase, such as a	
(a) child?	105	T.V., car, freezer, etc.?	26
(b) brother or sister?	64	53. taken on a major purchase or a mortgage loan,	
(c) parent?	66	such as a home, business, property, etc.?	39
(d) other close family member?	57	54. experienced a foreclosure on a mortgage or	
20. the death of a close friend?	46	loan?	57
21. a change in the marital status of your parents:		55. experienced a major change in finances:	
(a) divorce?	38	(a) increased income?	27
(b) remarriage?	33	(b) decreased income?	60
22. marriage?	50	(c) credit rating difficulties?	43
23. a change in arguments with your spouse?	34		
24. in-law problems?	29		

TABLE 2

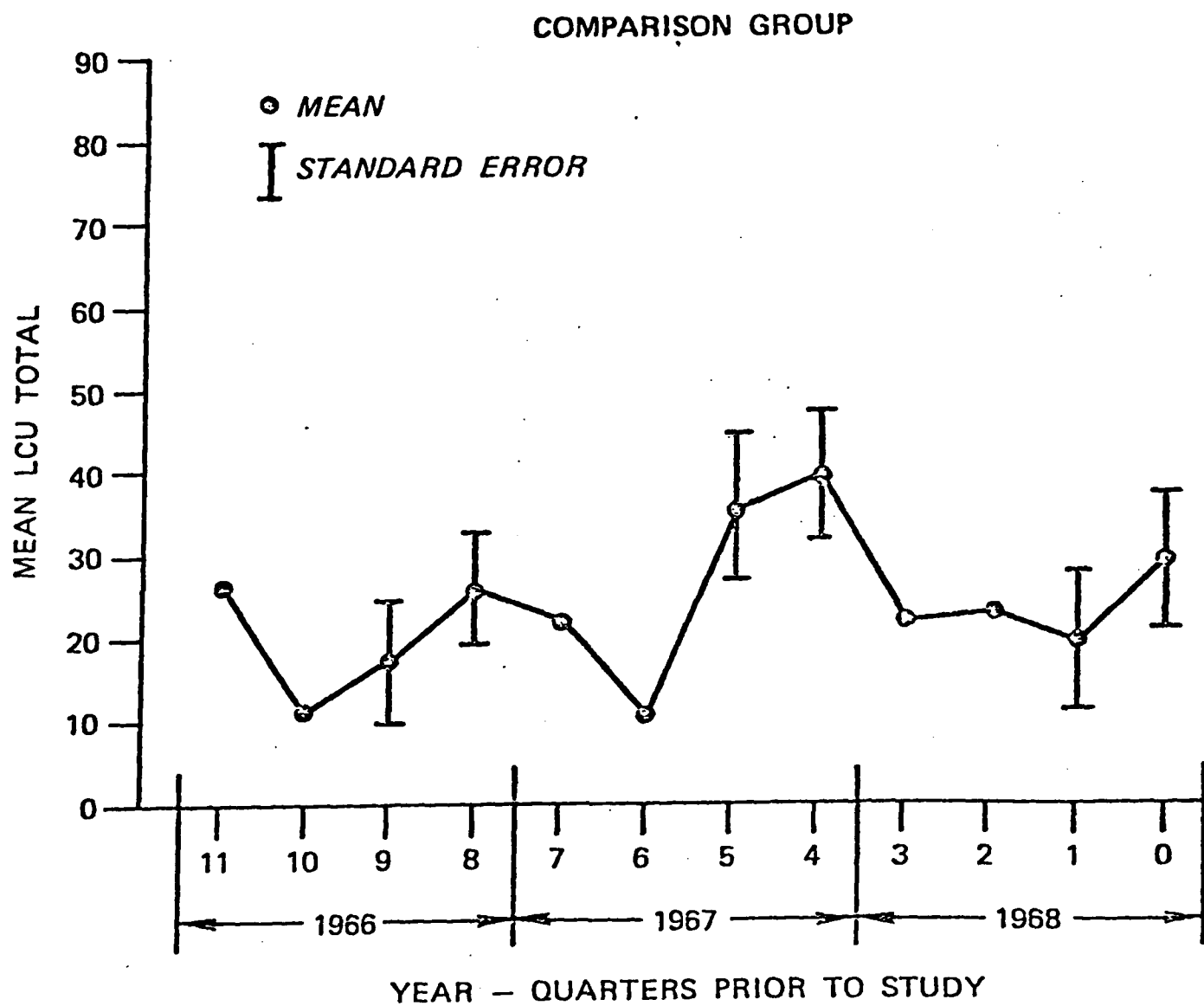


Figure 1. Healthy comparison group. Baseline life change data, by quarter-years, over a three-year period.

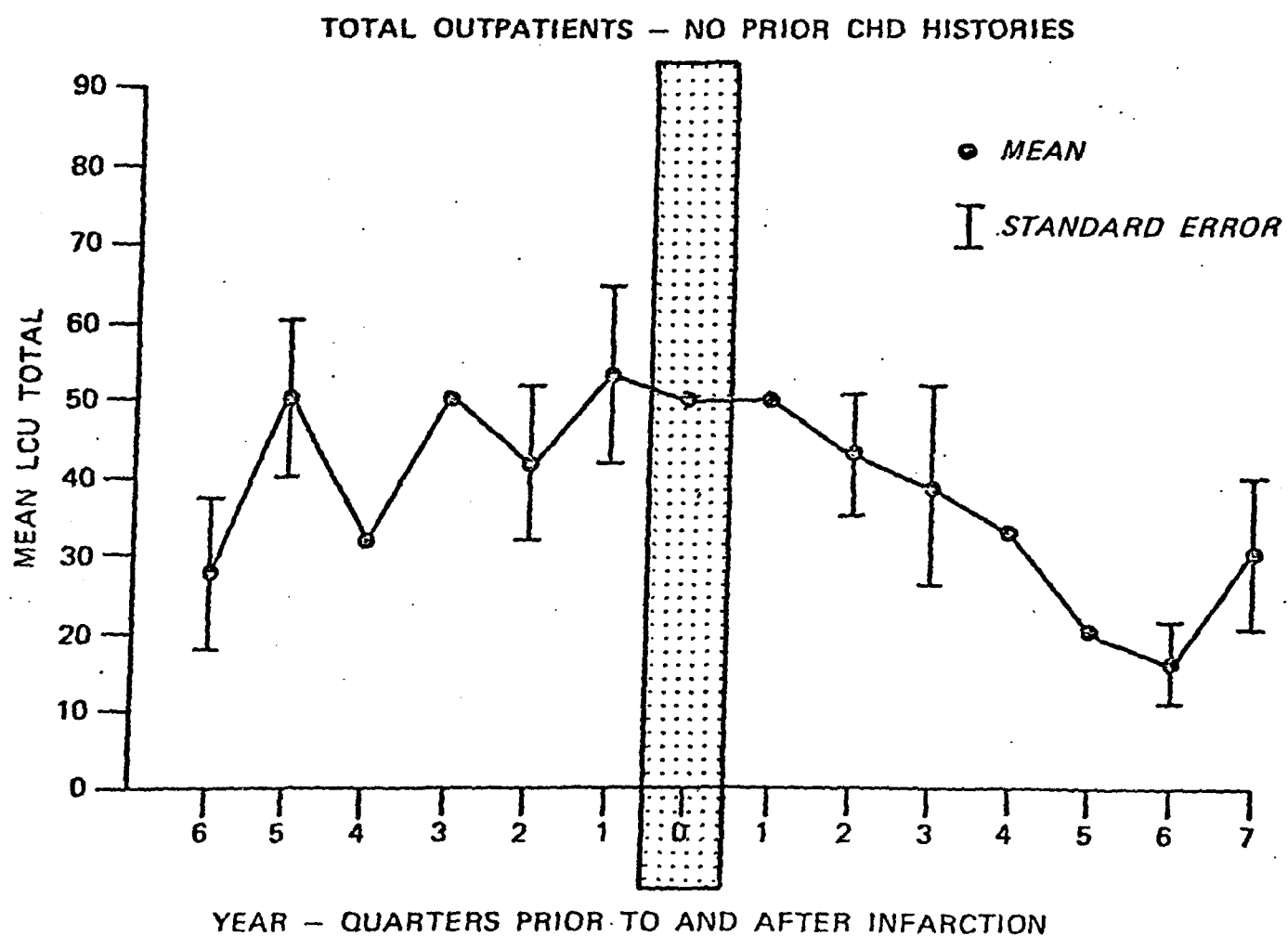


Figure 2. 47 outpatient visits who recovered from myocardial infarctions 2-3 years previously. Quarter-year life changes data prior to and following the time of infarction (represented by stippled bar).

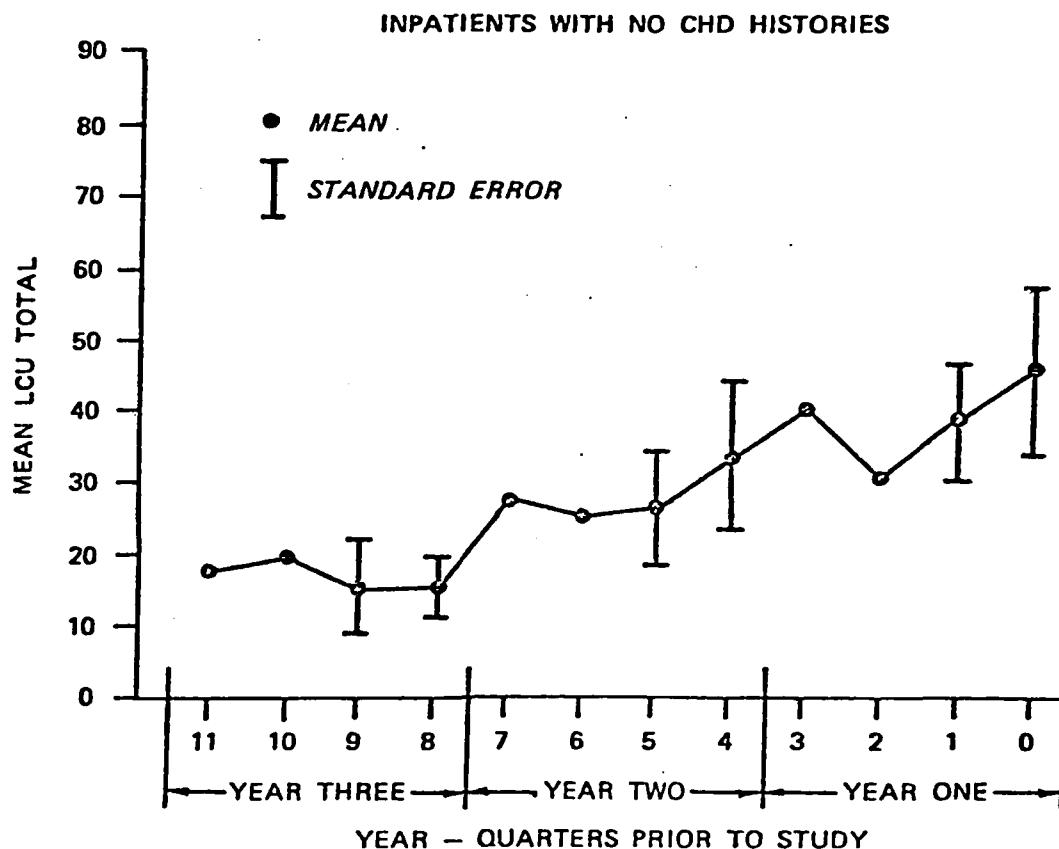


Figure 3. 27 inpatients with no prior history of heart disease recovering from their first myocardial infarction. Quarter-year life changes data over the antecedent 3 years.

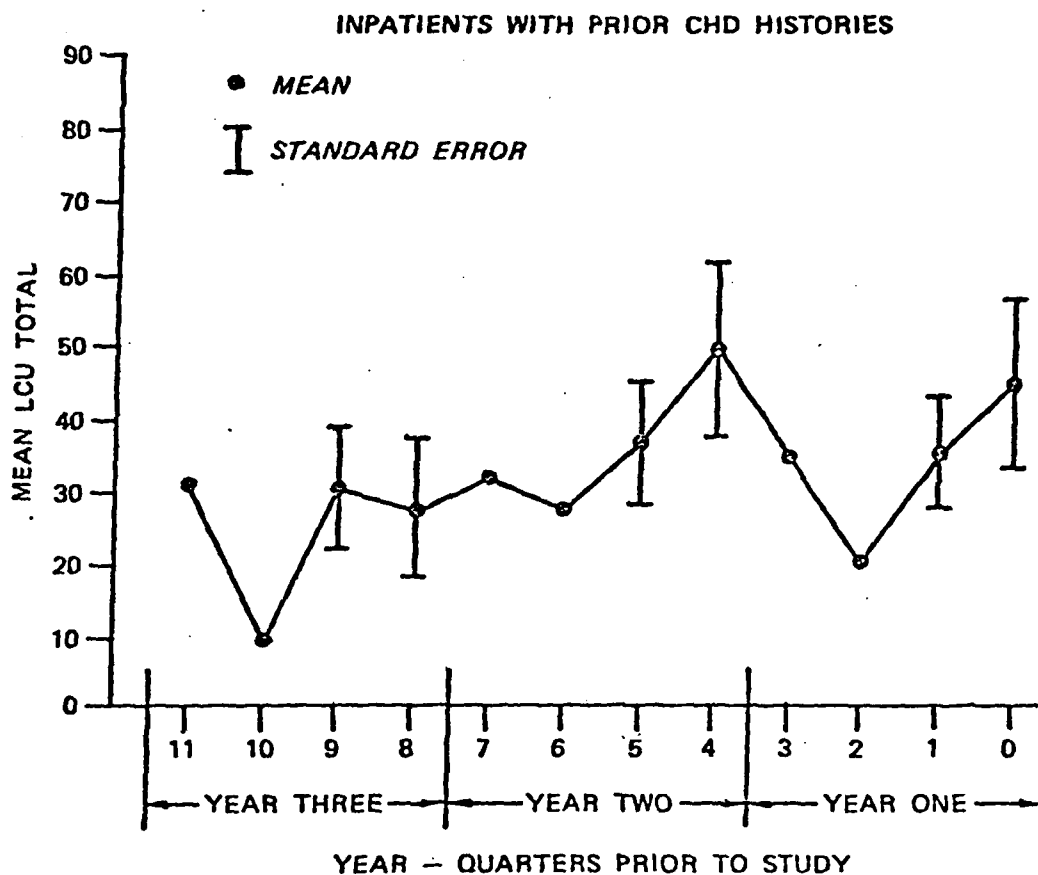


Figure 4. 27 inpatients with long term histories for heart disease recovering from myocardial infarction. Quarter-year life changes data over the antecedent 3 years.

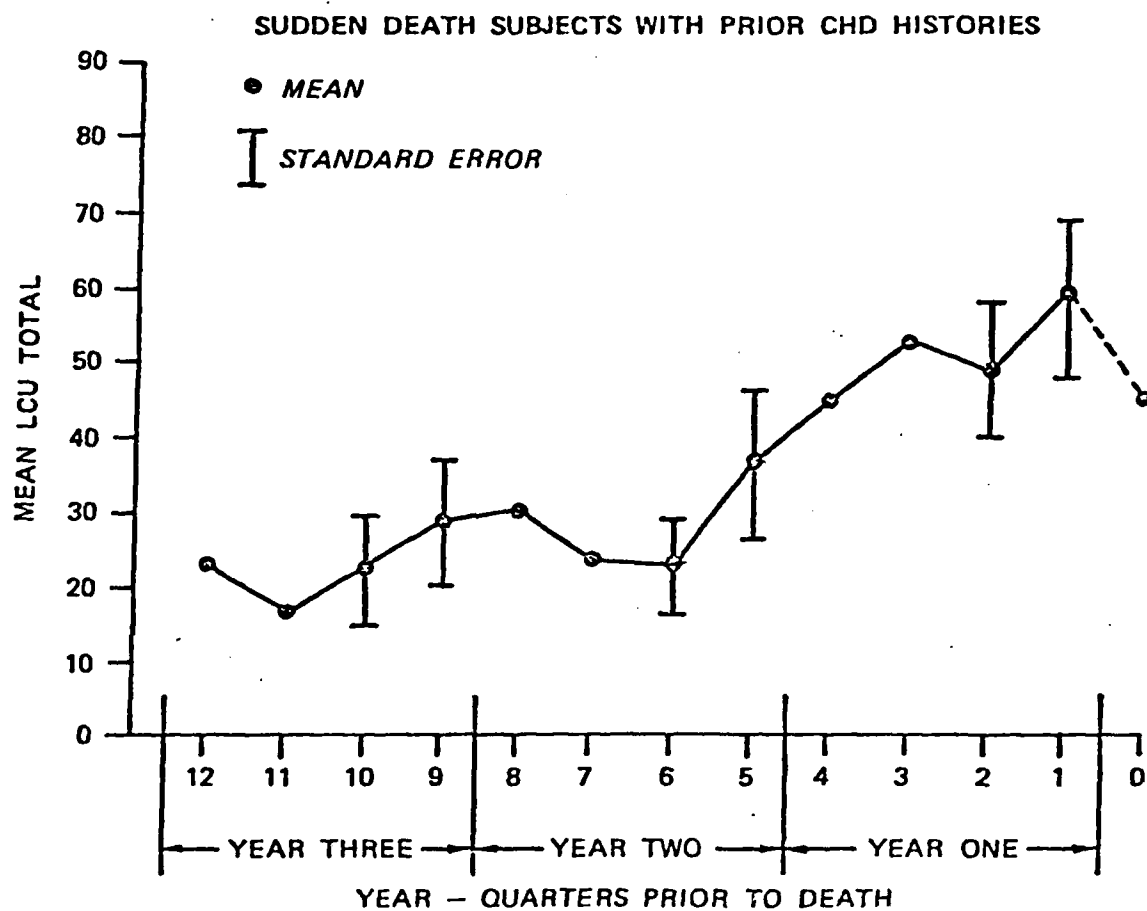


Figure 5. 27 victims of sudden coronary death who had long term histories of heart disease. Quarter year life changes data over the antecedant 3 years.

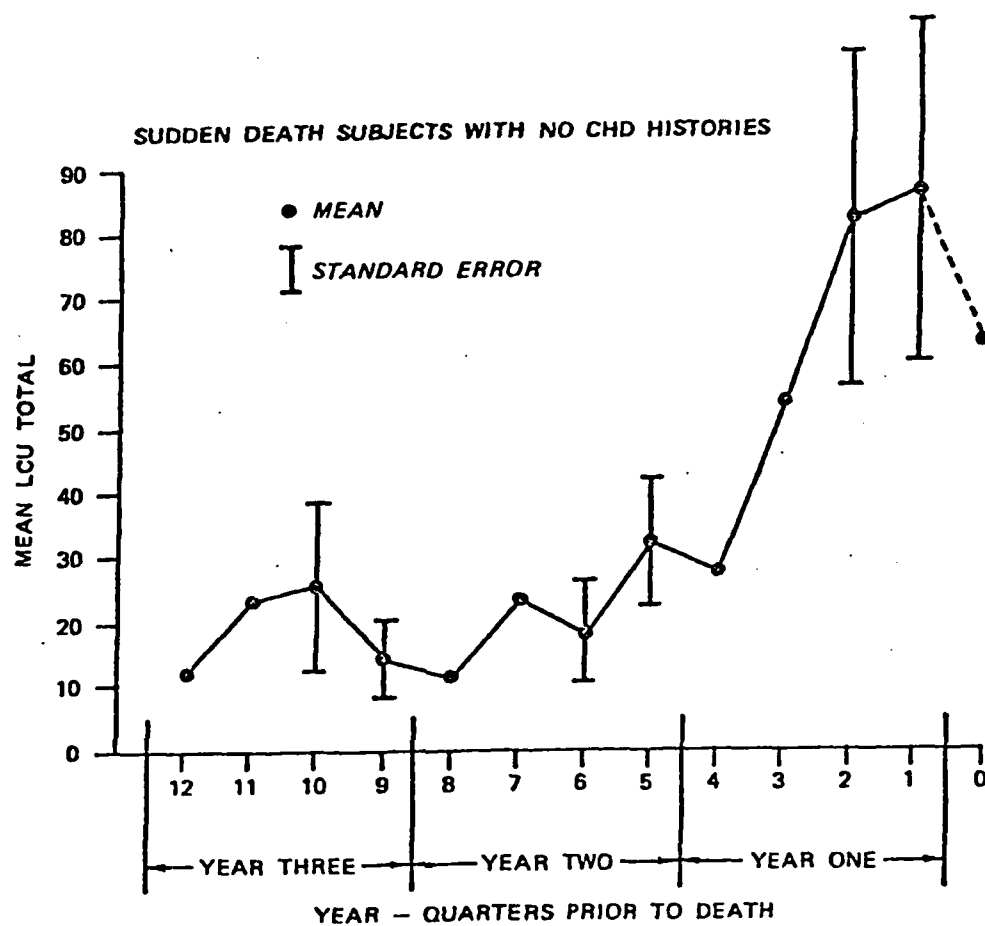


Figure 6. 10 victims of sudden coronary death without prior histories of heart disease. Quarter year life changes data over the antecedent 3 years.

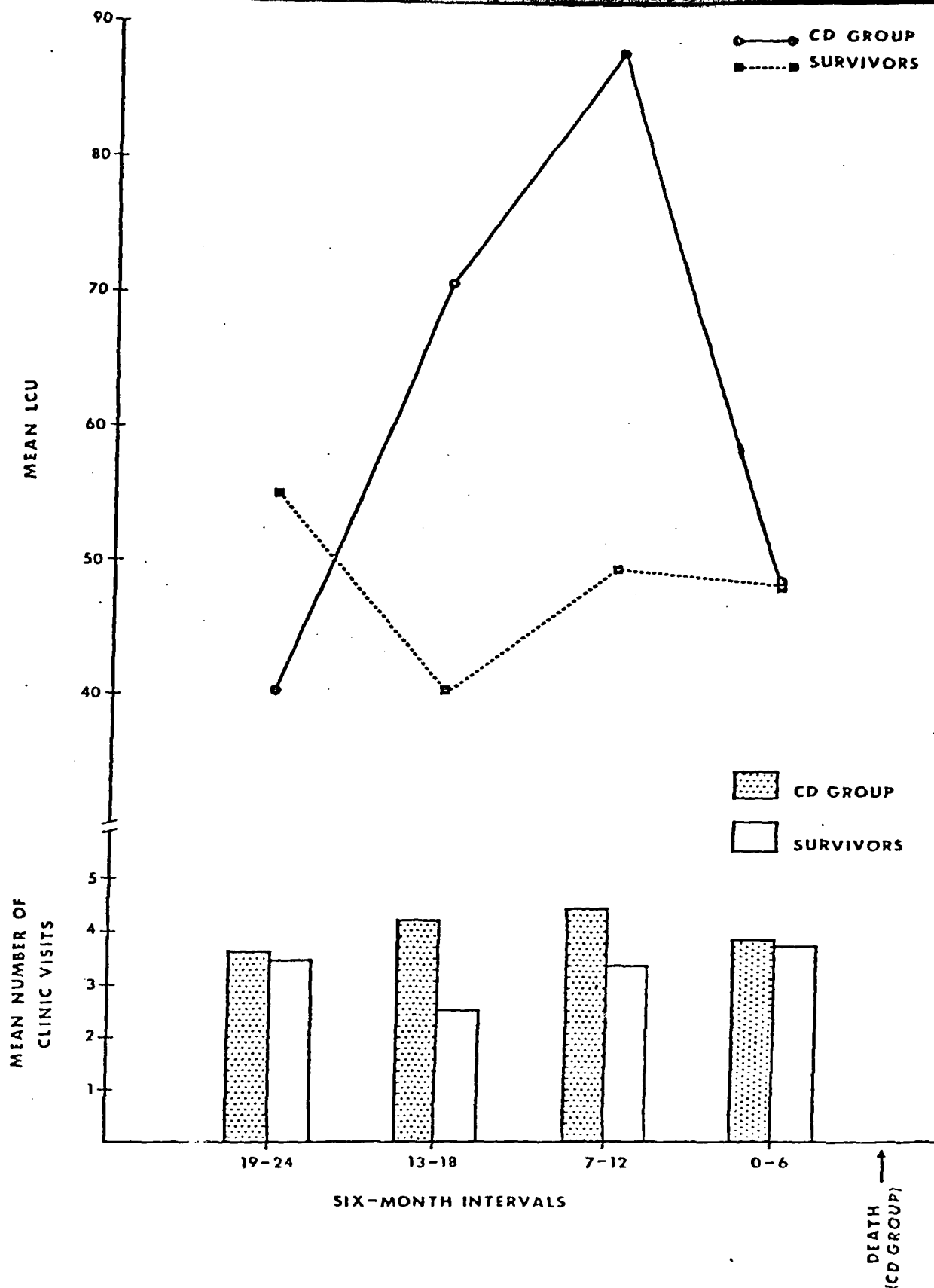


Figure 7. 18 long term survivors who remained in good health over a four-year recovery period following myocardial infarction (survivors) 18 victims of coronary death, or severe re-infarction, which occurred during their post infarction recovery period (CD Group). Quarter-year life change data, and clinic visits, collected prospectively up until the time of recurrent disease.

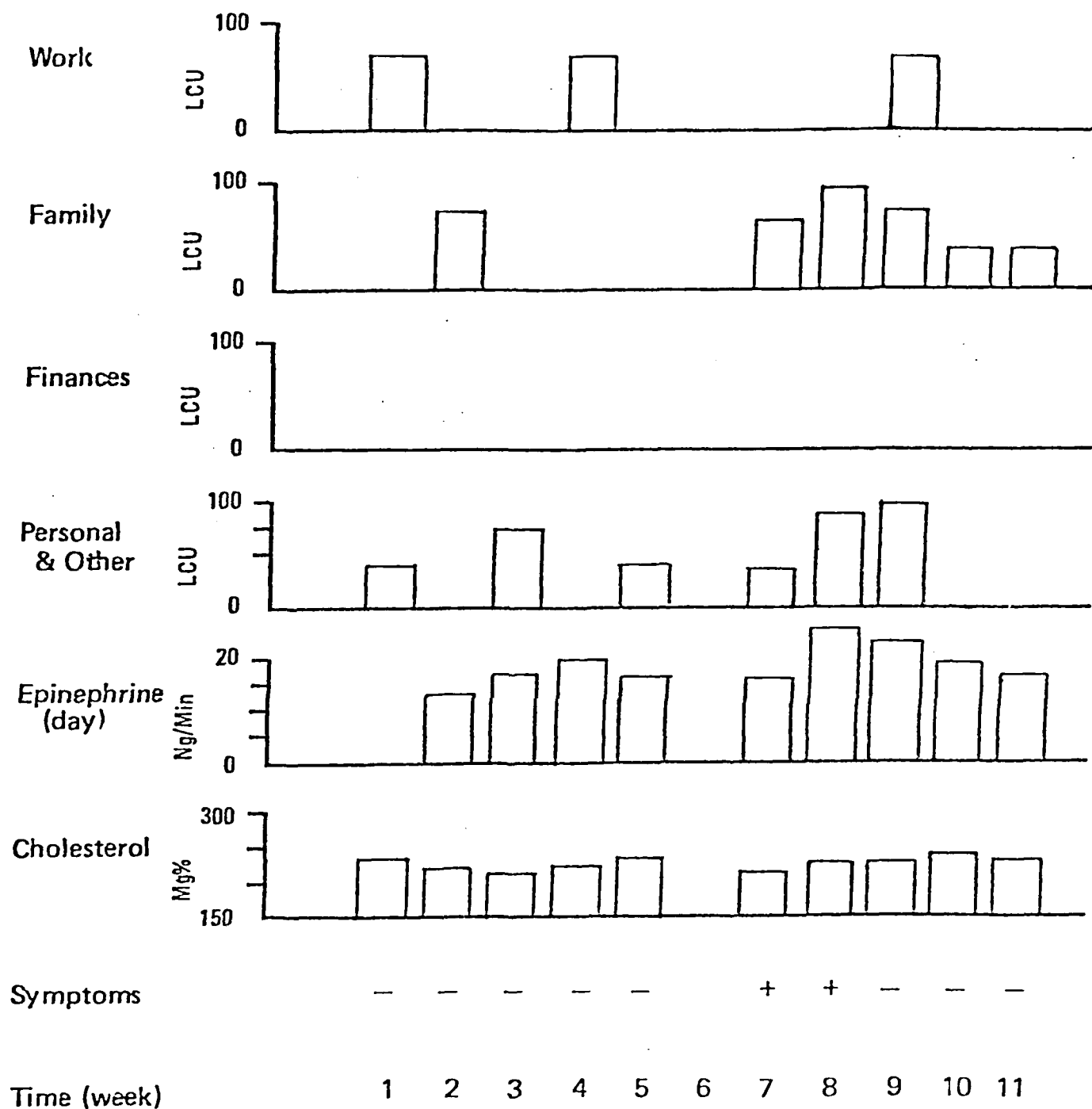


Figure 8. A case example of an outpatient who followed every week over the first few months following myocardial infarction. Weekly life changes data are presented along with urinary catecholamine excretion, serum cholesterol levels, and presence or absence of angina pectoris (symptoms).

FIGURE 8

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) For the clinician interested in the psychological management of patients with coronary heart disease (CHD), it is critical to have some grasp of both developmental characteristics of patients prone to this disorder as well as knowledge of the acute precipitating influence of life stress. Confusion abounds regarding these two rather distinct areas. Crucial among the developmental influences upon CHD proneness seem to be occupation-education disparity ("over-achievement"), Type A coronary behavior, and chronic life (Cont.)		

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dissatisfactions. One measure of life stress, recent life changes, appears to exert a marked influence upon clinical onset of CHD.

Optimal treatment of patients with CHD can be achieved with a knowledge of both the physical and the psychological aspects of this disease. In addition to the management of physical risk factors for this disorder, group therapy has proven to be a successful approach in the rehabilitation of patients recovering from acute myocardial infarction. Group therapy is an approach which can combine education regarding heart disease and its management with discussion of relevant developmental and recent life stress issues.

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